

National Health and Nutrition Examination Survey 2001–2002

Documentation, Codebook, and Frequencies

Surplus Specimen Laboratory Component:
Nitrate, thiocyanate, perchlorate (Surplus Urine)

Survey Years:
2001 to 2002

SAS Export File:
SSNO3P_B.XPT



First Published: September 2006
Last revised: N/A

NHANES 2001–2002 Data Documentation

Laboratory Assessment: Measurement of perchlorate, nitrate and thiocyanate (NHANES 2001 - 2002 Surplus Urine)

Years of Coverage: 2001–2002

First Published: September 2006

Last Revised: N/A

Component Description

Perchlorate, nitrate and thiocyanate were measured in all available urine samples from one of the environmental 1/3 subsets of study participants ages 6 and older in NHANES 2001 – 2002. Perchlorate, nitrate, and thiocyanate are polyatomic anions.

Eligible Sample

Study participants aged 6+ years from of NHANES 2001 - 2002 with stored urine

Description of Laboratory Methodology

Urine samples from NHANES 2001-2002 were stored frozen (-70°C) for up to 4 years before analysis. Experiments evaluating storage at -70°C for greater than 2 years indicate no changes in urinary levels of perchlorate, thiocyanate and nitrate. Samples were analyzed for perchlorate, thiocyanate and nitrate using ion chromatography tandem mass spectrometry (Valentin-Blasini et al. 2005). Chromatographic separation is achieved using an IonPac AS16 column with sodium hydroxide as the eluant. The eluant from the column is ionized using an electrospray interface to generate and transmit negative ions into the mass spectrometer. Comparison of relative response factors (ratio of native analyte to stable isotope labeled internal standard) with known standard concentrations yields individual analyte concentrations. The method is applicable to the determination of perchlorate in 0.05 µg/L of urine over the range 0.005 to 1000 µg/L. The limit of detection for thiocyanate was 20 µg/L and for nitrate 700 µg/L. Stable isotope labeled internal standards were employed in the analysis of perchlorate, thiocyanate and nitrate.

Laboratory Quality Control and Monitoring

All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet the Division of Laboratory Science's quality control and quality assurance performance criteria for accuracy and precision (similar to specifications outlined by Westgard (1981). All QC procedures recommended by the manufacturers were followed. Reported results for all assays meet the Division of Laboratory Science's quality control and quality assurance performance criteria for

accuracy and precision (similar to specifications outlined by Westgard (1981)).

Data Processing and Editing

All peak integrations were evaluated by trained employees in a blinded fashion. Subsequently quality control specimens were evaluated by an independent quality control officer. Reported results for all assays meet the Division of Laboratory Science's quality control and quality assurance performance criteria for accuracy and precision (similar to specifications outlined by Westgard (1981)). Quality control results are reported to NCHS along with the SP results.

Analytic Notes

Subsample weights

Measures of urinary perchlorate, thiocyanate, and nitrate were measured in a one third subsample of persons 6 years and over. Special sample weights are required to analyze these data properly. Specific sample weights for this subsample are included in this data file and should be used when analyzing these data.

Variance estimation

The analysis of NHANES 2001-2002 laboratory data must be conducted with the key survey design and basic demographic variables. The NHANES 2001-2002 Demographic Data File contains demographic and sample design variables. The recommended procedure for variance estimation requires use of stratum and PSU variables (SDMVSTRA and SDMVPSU, respectively) in the demographic data file.

Links to NHANES

This laboratory data file can be linked to the other NHANES 2001-2002 data files using the unique survey participant identifier SEQN.

Detection Limits

Urinary perchlorate measures were above the limit of detection (0.05 µg/L) for all samples. The limit of detection for thiocyanate was 20 µg/L and for nitrate 700 µg/L. The detection limit divided by the square root of 2 is the value that is provided for results that are below the limit of detection.

Please refer to the Analytic Guidelines for further details on the use of sample weights and other analytic issues.

References

Valentin-Blasini L, Mauldin JP, Maple D, Blount BC. 2005. Analysis of perchlorate in human urine using ion chromatography and electrospray tandem mass spectrometry. *Anal Chem* 77: 2475-2481.

Westgard JO, Barry PL, Hunt MR, Groth T. 1981. A multi-rule Shewhart chart for quality control in clinical chemistry. *Clin Chem* 27: 493-501.

NAS. 2005. Health Implications of Perchlorate Ingestion. Washington, D.C: National Research Council, National Academy Press.

Locator Fields

Title: Measurement of perchlorate, nitrate and thiocyanate

Contact Number: 1-866-441-NCHS

Years of Content: 2001-2002

First Published: September 2006

Revised: N/A

Access Constraints: None

Use Constraints: None

Geographic Coverage: National

Subject: Perchlorate, nitrate and thiocyanate

Record Source: NHANES 2001 - 2002 Surplus Urine

Survey Methodology: NHANES 2001–2002 is a stratified multistage probability sample of the civilian non-institutionalized population of the U.S.

Medium: NHANES Web site; SAS transport files

**National Health and Nutrition Examination Survey
Codebook for Data Production (2001-2002)**

**Nitrate, thiocyanate, perchlorate (Surplus Urine) (SSNO3P_B)
Person Level Data**

First Published: September 2006

Last Revised: N/A



SEQN	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Respondent sequence number
English Text: Respondent sequence number.	
English Instructions:	

SSXNO3	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Nitrate (ug/L)
English Text: Continuous variable describing urinary concentration of nitrate (NO3) (ug/L). Limit of detection: 700 ug/L.	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
495 to 770000	Range of Values	2818	2818	
.	Missing	124	2942	

SSXSCN	Target
	B(6 Yrs. to 150 Yrs.)
Hard Edits	SAS Label
	Thiocyanate (ug/L)
English Text: Continuous variable describing urinary concentration of Thiocyanate (SCN) (ug/L). Limit of detection: 20 ug/L.	
English Instructions:	

Code or Value	Description	Count	Cumulative	Skip to Item
14 to 37000	Range of Values	2817	2817	
.	Missing	125	2942	

SSXUP8		Target		
		B(6 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Urinary Perchlorate (ug/L)		
English Text: Urinary Perchlorate (ug/L)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
0.19 to 160	Range of Values	2820	2820	
.	Missing	122	2942	

URXUCR		Target		
		B(6 Yrs. to 150 Yrs.)		
Hard Edits		SAS Label		
		Creatinine, urine (mg/dL)		
English Text: Creatinine, urine (mg/dL)				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
9 to 774	Range of Values	2847	2847	
.	Missing	95	2942	

WTUIO2YR	Target			
	B(6 Yrs. to 150 Yrs.)			
Hard Edits	SAS Label			
	Subsample 2 year Mec Weight			
English Text: Subsample 2 year Mec Weight				
English Instructions:				
Code or Value	Description	Count	Cumulative	Skip to Item
3528.5 to 663502.48	Range of Values	2892	2892	
0	Zero	50	2942	
.	Missing	0	2942	